

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

--Claim 1-22 (Cancelled).

Claim 23. (New) A method for producing a metal alloy, wherein a certain desired content of an alloying constituent is fed to said metal alloy in a vessel at overpressure, wherein said alloying constituent is gaseous in its normal state, said method comprising:

adding the alloying constituent as a gas and an inert gas to the atmosphere contained in the vessel in such quantities that a particular initial concentration ratio between the gaseous alloying constituent and the inert gas exists in the atmosphere of the vessel;

determining changes over time of total gas pressure, changes over times of the concentration of the inert gas and of the gaseous alloying constituent in the atmosphere contained in the vessel, and changes over time of the mean gas temperature of the atmosphere contained in the vessel;

determining the mass loss of the inert gas in the atmosphere of the vessel, said mass loss being due to lack of tightness of the vessel, taking into account the total gas pressure, the concentration of the inert gas, the concentration of the gaseous alloying constituent, and the mean gas temperature;

determining a theoretical mass loss of the gaseous alloying constituent in the atmosphere from the initial concentration ratio, said theoretical mass loss resulting from the lack of tightness of the vessel;

determining the mass fraction of the gaseous alloying constituent transferred into the metal alloy by comparing the theoretical mass loss with the actual mass loss of the gaseous alloying constituent, the actual mass loss of the gaseous alloying constituent being determined from the actual concentration of the gaseous alloying constituent in the vessel; and

introducing the gaseous alloying constituent into the atmosphere of the vessel in such quantities and for such a period of time that the metal alloy has a desired content of the gaseous alloying constituent.

Claim 24. (New) A method according to claim 23, further comprising maintaining the total pressure of the atmosphere and the partial pressure of the gaseous alloying constituent by a metered addition of the gaseous alloying constituent.

Claim 25. (New) A method according to claim 23, further comprising adding by metering the inert gas into the atmosphere of the vessel in addition to the gaseous alloying constituent.

Claim 26. (New) A method according to claim 23, wherein the metered addition of the gaseous alloying constituent takes place independently of the metered addition of the inert gas.

Claim 27. (New) A method according to claim 23, wherein the metered addition of the gaseous alloying constituent takes place by means of solid particles, wherein said solid particles contain the gaseous alloying constituent in bound form, said solid particles releasing the gaseous alloying constituent at a known concentration when exposed to heat.

Claim 28. (New) A method according to claim 23, further comprising:
measuring the temperature of the atmosphere contained in the vessel in at least in one location; and
determining the mean gas temperature on the basis of said measuring step taking into account a previously determined correlation between the temperature at the one location and the mean gas temperature.

Claim 29. (New) A method according to claim 23, wherein the mean gas temperature is measured by means of a rise in pressure, said rise in pressure being triggered in the vessel by a temporary addition of a known inert gas volume.

Claim 30. (New) A method according to claim 23, wherein the gaseous alloying constituent is nitrogen.

Claim 31. (New) A method according to claim 23, wherein the inert gas is argon.

Claim 32. (New) A method according to claim 23, wherein the metal alloy is a steel alloy.

Claim 33. (New) A method according to claim 27, wherein the solid particles are added by metering in the form of a powder or a granulate.

Claim 34. (New) A method according to claim 33, wherein the solid particles comprise a metal nitride or a metal carbonitride.

Claim 35. (New) A method according to claim 34, wherein the solid particles comprise silicon nitride, chromium nitride, manganese nitride, lime-nitrogen, or combinations thereof.

Claim 36. (New) A method according to claim 23, further comprising placing the metal alloy in the vessel in solid form, and performing a remelting process of said metal alloy in the vessel.

Claim 37. (New) A method according to claim 36, further comprising performing the remelting process as an electroarc refining process or as an electroslag refining process.

Claim 38. (New) A method according to claim 36, further comprising registering the volume of the metal alloy remelted per unit of time and determining a quantity of the gaseous alloying constituent to be added by metering taking in account said volume of said remelted metal alloy.

Claim 39. (New) A device for implementing the method according to claim 23, said device comprising:

- a vessel which contains an atmosphere and a metal alloy at overpressure;
- a heating device which generates a melt from the metal alloy;
- a first metering device which feeds an alloying constituent into the vessel, said alloying constituent being gaseous in its normal state;
- a second metering device which feeds an inert gas into the vessel;
- a pressure sensor which registers a total pressure of the atmosphere contained in the vessel;
- a temperature sensor which registers the temperature of the atmosphere in the vessel in at least one location;

a concentration-measuring device which determines concentrations of the inert gas and of the gaseous alloying constituent in the atmosphere contained in the vessel;

an evaluation unit which evaluates the total pressure, the temperature of the atmosphere and the concentrations of the inert gas and of the gaseous alloying constituent; and

a control device which controls the feeding of the inert gas and of the gaseous alloying constituent into the vessel based upon the evaluation of the evaluation unit.

Claim 40. (New) A device according to claim 39, further comprising a valve, wherein said valve releases the atmosphere contained in the vessel.

Claim 41. (New) A device according to claim 39, wherein the heating device comprises an induction furnace or an electric arc furnace.

Claim 42. (New) A device according to claim 39, further comprising a third metering device which feeds solid particles into the vessel.

Claim 43. (New) A device according to claim 39, further comprising a device for registering amounts of particles fed into the vessel by the third metering device, wherein during the evaluation, the evaluation unit takes into account the amount of particles fed into the vessel.

Claim 44. (New) A device according to claim 39, further comprising a measuring device which measures volumes of melted metal alloy in the vessel, wherein during the evaluation, the evaluating unit takes into account the measured volumes of the melted metal alloy.